



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 3, 2024

James Barstow, Vice President
Nuclear Regulatory Affairs
and Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A-C
Chattanooga, TN 37402

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 – LICENSE
RENEWAL REGULATORY SCOPE AUDIT REGARDING THE
ENVIRONMENTAL REVIEW OF THE LICENSE RENEWAL APPLICATION
(EPID NUMBER: L-2024-SLE-0000) (DOCKET NUMBERS: 50-259, 50-260,
AND 50-296)

Dear James Barstow:

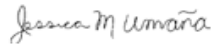
By letter, dated January 19, 2024 (Agencywide Documents Access and Management System ML24019A010), Tennessee Valley Authority, submitted an application for subsequent license renewal of Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant Units 1, 2, and 3 (BFN), to the U.S. Nuclear Regulatory Commission (NRC) pursuant to Section 103 of the Atomic Energy Act of 1954, as amended, and Part 54 of Title 10 of the *Code of Federal Regulations*, "Requirements for renewal of operating licenses for nuclear power plants."

The NRC staff has initiated the environmental review for the application. A virtual environmental audit will be conducted the week of September 30, 2024, by NRC staff (see Enclosure 1), with a site-visit following the week of October 7, 2024.

To the extent possible, the NRC staff requests the information identified in the Environmental Audit Needs List (Enclosure 2) be made available on the Browns Ferry online reference portal two weeks prior to the audit. A draft schedule of tours and meetings is provided in Enclosure 3.

If you have any questions, please contact me via email at jessica.umana@nrc.gov.

Sincerely,

A handwritten signature in dark ink, appearing to read "Jessica M. Umaña".

Signed by Umana, Jessica
on 09/03/24

Jessica Umaña, Environmental Project Manager
Environmental Project Management Branch 1
Division of Rulemaking, Environmental,
and Financial Support
Office of Nuclear Material Safety
and Safeguards

Docket Nos. 50-259, 50-260, and 50-296

Enclosures:

As stated

cc w/encls: Listserv

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3 – LICENSE RENEWAL REGULATORY SCOPE AUDIT REGARDING THE ENVIRONMENTAL REVIEW OF THE LICENSE RENEWAL APPLICATION (EPID NUMBER: L-2024-SLE-0000) (DOCKET NUMBERS: 50-259, 50-260, AND 50-296)

DATED: September 3, 2024

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NAME	JUmana	AWalker-Smith	Steve Koenick	
DATE	8/ 26 /2024	8/ 29 /2024	8/29 /2024	

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Audit Plan

**License Renewal Environmental Review
Browns Ferry Nuclear Plant Unit 1, 2 and 3**

September 2024

**Division of Materials and License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission**

License Renewal Environmental Review Browns Ferry Nuclear Power Plant Units 1, 2, and 3

1. Background

By letter, dated January 19, 2024 (Agencywide Documents Access and Management System ML24019A010), Tennessee Valley Authority, submitted an application for subsequent license renewal of Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant Units 1, 2, and 3 (Browns Ferry) pursuant Section 103 of the Atomic Energy Act of 1954, as amended, and Part 54 of Title 10 of the *Code of Federal Regulations* (10 CFR), “Requirements for renewal of operating licenses for nuclear power plants.” A *Federal Register* (FR) Notice (89 FR 8725) dated January 19, 2024, noted the receipt and availability of the application, including the environmental report (ER).

The U.S. Nuclear Regulatory Commission (NRC) staff is conducting an environmental audit of the Browns Ferry site to improve understanding, verify information, and identify information for docketing to support the preparation of an environmental impact statement. Specifically, the NRC staff will be identifying pertinent environmental data, reviewing the facility, and seeking clarifications regarding information provided in the ER.

2. Environmental Audit Bases

License renewal requirements for ERs are specified in 10 CFR 51, “Postconstruction environmental reports.” As specified by 10 CFR 51.53(c): *Operating license renewal stage*, “(1) Each applicant for renewal of a license to operate a nuclear power plant under Part 54 of this chapter shall submit with its application a separate document entitled “Applicant’s Environmental Report—Operating License Renewal Stage.” Review guidance for the staff is provided in NUREG–1555, Supplement 1, Revision 2, “Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Supplement 1 – Operating License Renewal.”

On August 6, 2024, the NRC published a final rule (89 FR 64166) revising its environmental protection regulation, 10 CFR part 51, “Environmental protection regulations for domestic licensing and related regulatory functions.” The final rule updates the potential environmental impacts associated with the renewal of an operating license for a nuclear power plant for up to an additional 20 years for either an initial license renewal or SLR. Revision 2 to NUREG-1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants” (LR GEIS) (ML24087A133) provides the technical basis for the final rule. The revised LR GEIS specifically supports the updated list of environmental issues and associated environmental impact findings contained in table B-1 in appendix B to subpart A of the revised 10 CFR part 51 for both initial license renewals and first SLRs.

The final rule will become effective for the NRC staff on September 6, 2024, and staff must now consider the new and modified issues, as applicable, in its license renewal EISs. Accordingly, the NRC staff intends to prepare a plant-specific supplement to the LR GEIS for the Browns Ferry SLR application (SEIS). The SEIS will rely on the LR GEIS determinations for Category 1 issues. Site-specific information will be considered only on Category 2 issues and screened for new and significant information on Category 1 issues.

3. Environmental Audit Scope

The scope of this environmental audit is to identify new and significant issues and issues which can be eliminated from further study. The NRC staff will also identify environmental resources that must be described and evaluated in the SEIS. Audit team members will review the documents and other requested information made available on the Browns Ferry online reference portal identified on the environmental audit needs list (Enclosure 2) and discuss any questions and additional information needs with the applicant's subject matter experts.

4. Environmental Audit Team Members and Resource Assignments

The environmental audit team members and their assignments are shown in the table below.

Resource	NRC Staff	PNNL Staff
Management	Steve Koenick	Catilin Condon*
Environmental PM	Jessica Umana*	
Environmental PM support	Angela Sabet*	
Replacement Power Alternatives	Bob Hoffman	
Land Use and Visual Resources	Caroline Hsu	
Air Quality	Nancy Martinez	
Meteorology and Climatology	Nancy Martinez	
Noise	Nancy Martinez	
Geologic Environment	Gerry Stirewalt	
Surface Water	Lloyd Desotell	Phil Meyer*
Groundwater	Gerry Stirewalt	Becka Bence
Terrestrial Resources	Caroline Hsu	Ann Miracle Tracey Fuentes
Aquatic Resources	Peyton Doub	Ann Miracle Patrick Mirick
Federally Protected Ecological Resources	Peyton Doub	Ann Miracle Patrick Mirick Tracy Fuentes
Historic and Cultural Resources	Jeffery Larson* Nancy Martinez	Lindsey Renaud*
Socioeconomics	Caroline Hsu Jeff Rikhoff	
Human Health	Leah Parks	
Environmental Justice	Caroline Hsu Jeff Rikhoff	
Waste Management	Don Palmrose	
Spent Nuclear Fuel	Don Palmrose	
Uranium Fuel Cycle	Leah Parks	
Termination of Operations and Decommissioning	Leah Parks	
Greenhouse Gas Emissions and Climate Change	Nancy Martinez	
Cumulative Impacts	Bob Hoffman Jeff Rikhoff	Dave Goodman Ann Miracle
Postulated Accidents	Jay Robinson	

*Will attend site visit/in-person audit.

5. Logistics

An environmental audit will be conducted by the NRC staff virtually the week of September 30, 2024, followed by a site-visit the week of October 7, 2024. An entrance meeting will be held with plant management at the beginning of the audit. The exit meeting will be held when all resource areas have held their breakout sessions and scheduled at a later date.

6. Special Requests

The NRC staff requested TVA make available on the Browns Ferry online reference portal, the information identified on the environmental audit needs list (Enclosure 2). Tennessee Valley Authority staff and contractors who are subject matter experts in the disciplines identified on the environmental audit needs list should be available for interviews and tours.

7. Deliverables

An audit summary report will be issued by the NRC staff within 90 days from the end of the environmental audit.

**Browns Ferry Nuclear Power Plant Units
1, 2 and 3**

Audit and Information Needs

The U.S. Nuclear Regulatory Commission (NRC) staff's information needs are described below in three categories: meetings, tours, and information needs. Information needs are identified as either resource-specific questions or document requests. Please arrange for the tours and meetings specified below to occur during either the virtual environmental audit or site-visit as noted. Additionally, staff ask that you provide responses to the information needs on the electronic portal and make subject matter experts available to discuss these items with the NRC staff.

Meetings

Please be prepared to schedule breakout meetings with the appropriate subject matter expert(s) and/or contractor(s) concerning the following topics. Those in attendance should be prepared to discuss the corresponding questions as described in the "Information Needs and Document Requests" section below. The staff intends to use these breakout meetings, as needed, to resolve or clarify any outstanding data needs or questions arising from the environmental audit. NRC intends to leverage virtual breakout meetings to the extent possible. Any in-person breakout sessions are specified.

- Replacement Energy Alternatives (and Cumulative Effects – reasonably foreseeable future actions, if necessary)
- Land use and Visual Resources
- Air Quality and Noise
- Meteorology and Climatology
- Geologic Environment
- Groundwater and Surface Water Resources
- Ecological Resources (Aquatic, Terrestrial, Federally Protected) Land Use and Visual Resources
- Historic and Cultural Resources
- Socioeconomics
- Human Health
- Environmental Justice
- Waste Management (including Termination of Operations & Decommissioning)
- Spent Nuclear Fuel
- Uranium Fuel Cycle
- Greenhouse Gas Emissions and Climate Change
- Postulated Accidents/Severe Accident Mitigation Analysis (SAMA) analysis and results

Browns Ferry Site-Specific Information Needs for Full Scope Audit

Tours

Please arrange for, and provide appropriate subject matter experts to contribute to, the following virtual tours. For the virtual tours/walk-throughs, please provide photographs, diagrams, location maps, and/or callouts for specific components that would be of interest for the features noted.

Number and Title	Features Observed	NRC Participants	PNNL Participants
1. General site tour	<ul style="list-style-type: none"> Exterior grounds Transmission lines Historic and cultural sites Possible alternative power generation locations Independent Spent Fuel Storage Installation (ISFSI) Plant views from publicly accessible areas 	All	All
2. Plant intake and discharge tour	Intake and discharge structures within Wheeler Reservoir <ul style="list-style-type: none"> Trash stacks, traveling screens, and debris filter Cooling towers and cooling tower basin Warm water channel, discharge diffusers Map showing the discharge mixing zone in Wheeler Reservoir Site surface water features (e.g. streams, ponds and canals) Stormwater drainage system including any monitoring locations National Pollutant Discharge Elimination System (NPDES) outfall locations Intake pumping forebay and gates 	Gerry Stirewalt	Rajiv Prasad Kazi Tamaddun Stephen Ferencz Philip Meyer Caitlin Wessel
3. Radwaste tour	Please show: <ul style="list-style-type: none"> in greater detail than shown in Environmental Report (ER) figure 2.2-1 the low level radioactive waste HazWaste storage area and ISFSI pads 	Don Palmrose	

Number and Title	Features Observed	NRC Participants	PNNL Participants
	<ul style="list-style-type: none"> any potential future expansions as noted in ER Section 4.1.1 		
4. Terrestrial Resources	<ul style="list-style-type: none"> Pictures of the forests, particularly Zones 1 and 2 as shown in ER figure 3.6-1. 	Caroline Hsu	Dana Vesty, Tracy Fuentes

Information Needs and Document Requests

Information needs and document requests are identified below by resource area below.

General (Umaña, NRC)

The following requests are generic to more than one environmental review area. Issues from table 2.1-1 applicable to these questions are provided below along with the responsible NRC subject matter expert, as appropriate.

Audit Needs

- GEN-1 Please provide any relevant updates to table 9.1-1, "Environmental Authorizations for Current BFN." If any authorizations have expired since Tennessee's Valley Authority (TVA's) Application for Subsequent Renewed Operating License, dated January 19, 2024 ((Agencywide Documents Access and Management System (ADAMS) ML24019A010), provide the status of those permits and/or renewals.
- GEN-2 Have there been any documented unplanned releases of radioactive materials (unplanned/ inadvertent radioactive liquid or gaseous releases) since TVA's ER dated January 19, 2024 (ML24019A010)? If so, please provide a written description of the releases and be prepared to discuss these releases in relation to the following environmental issues, which were previously dispositioned as generic (Category 1), as applicable.
- Aquatic Resources – Exposure of aquatic organisms to radionuclides (Doub, NRC, Wessel, PNNL)
 - Groundwater – Radionuclides released to groundwater (including unplanned or inadvertent releases to soil and subsurface) (Stirewalt, NRC, Meyer, PNNL)
 - Human Health – Radiation exposures to the public (Parks, NRC)
 - Human Health – Radiation exposures to plant workers (Parks, NRC)

- Surface Water Resources – Discharge of metals in cooling system effluent (Desotell, NRC, Prasad, Tamaddun, and Ferencz, PNNL)
- Surface Water Resources – Discharge of biocides, sanitary wastes, and minor chemical spills (Desotell, NRC, Prasad, Tamaddun, and Ferencz, PNNL)
- Terrestrial Resources – Exposure of terrestrial organisms to radionuclides (Hsu, NRC, Vesty, and Fuentes, PNNL)
- Uranium Fuel Cycle – Transportation (Parks, NRC)
- Waste Management – Low-level waste storage and disposal (Palmrose, NRC)
- Waste Management – Mixed-waste storage and disposal (Palmrose, NRC)
- Waste Management – Offsite radiological impacts of spent fuel and high-level waste disposal (Palmrose, NRC)

GEN-3

Have there been any reportable inadvertent releases or spills of **nonradioactive contaminants** since the ER was published January 19, 2024 (ML24019A010)? If so, please provide a written description of the releases or spills and be prepared to discuss these releases or spills in relation to the following environmental issues.

- Waste Management – Mixed-waste storage and disposal (Palmrose, NRC)
- Waste Management – Nonradioactive waste storage and disposal (Palmrose, NRC)

Topic-specific

The following requests are specific to a single-environmental review area. If a topic is not provided below, the discussion held in response to the generic requests above are expected to fully cover that topic.

Replacement Power Alternatives (Hoffman NRC, Goodman and Hare PNNL)

Audit Needs

- ALT-1 Section 7.2.1 of the ER describes a combination energy alternative that TVA has identified as reasonable. The replacement energy alternative assumes a combination of natural gas, solar, energy storage, and new small modular reactor (SMRs). Under TVA's 2019 Integrated Resource Plan, various scenarios/strategies have been developed that present a mix of energy resources. For purposes of analysis, can any of these strategies be identified as representative? For example, Scenario 6C in the 2019 Integrated Resource Plan would involve the construction and operation of 1,200 of SMRs, 2,500 of natural gas, and the remainder solar and storage. Would carrying forward this scenario as representative be reasonable?

Land Use and Visual (Hsu NRC, Goodman and Hare, PNNL)

Audit Needs

- LUV-1 Section 3.1 of the Environmental Report does not specify surrounding access. The 2005 Browns Ferry supplemental environmental impact statement (NUREG 1437, Supplement 21) includes the following information:
- Browns Ferry Nuclear Plant Units 1, 2, and 3 (BFN) does not have direct rail service; however, a railway spur track with an unloading area is located off the CSX (Louisville and Nashville Railroad) mainline that runs north and south in Tanner, Alabama, approximately 13 km (8 mi) east of BFN. TVA leased this small parcel of land from CSX and used it for offloading during construction of BFN; however, TVA has not used the spur and unloading area for offloading and transporting materials to the plant since then. After offloading, heavy items were transported on heavy trucks via a "hardened" pathway to the site. This pathway included shallow fords through creek beds along the way. At the site, a short railroad spur runs into the turbine building for transport into the plant (TVA 2003a). The railroad spur track and unloading area may be used for future removal of dry cask spent fuel storage canisters from the site. There are no plans to use it for Unit 1 restart activities or regular plant operations.
- Traffic on the Tennessee River near BFN includes both commercial and recreational vessels. The river channels and the locks at Guntersville Lock and Dam and at Wheeler Dam are more than adequate for handling river traffic. Both Guntersville Lock and Wheeler Lock are operating below their utilization capacity (TVA 2003a).
- BFN has a qualified barge facility near the northwest corner of the site. Currently it consists of barge tie points and a wide ramp going down into the water. The

ramp was used during initial plant construction to transport very heavy loads such as reactor vessels. The barge facility is currently used several times per year, but a temporary crane has to be brought in to unload the barge each time. The roadbed from the plant to the barge facility is "hardened" for heavy loads. Future work is contemplated to upgrade the barge facility by stabilizing the riverbank and installing anchoring cells and a permanent dock (so that the facility will no longer require use of a temporary crane). An upgraded barge facility could eventually be used to facilitate transport of spent fuel canisters offsite for disposal in a national repository. The barge facility would likely be used for some heavy items during Unit 1 restart; however, its use for this purpose and the proposed facility upgrade is independent of the decision to restart Unit 1. Appropriate environmental analyses would be done if TVA decides to propose upgrading the barge facility.

Please provide any updates to these access facilities, as appropriate.

LUV-2 Please update the land cover data (as discussed in ER tables 3.1-1 and 3.1-2 and ER Section 3.1.1 and referenced in ER Section 3.5.1.1) with National Land Cover Database 2021.

Air Quality (Martinez, NRC)

Audit Needs

AQ-1 Has TVA received any notices of violation or noncompliance regarding Browns Ferry synthetic minor source permit within the last 5 years?

AQ-2 Does TVA submit annual air emission reports to the Alabama Department of Environmental Management in association with Browns Ferry synthetic minor source permit? If so, please provide a copy of the last 3 annual air emission reports.

Meteorology and Climatology (Martinez, NRC)

Audit Needs

MET-1 Section 2.2 of the ER identifies that to the east of the central site area is the meteorological tower. Section 3.2.1 of the ER states that the meteorological facility consists of a 91-meter (300-foot) instrumented tower for wind and temperature measurements, a separate 10-meter (33-foot) tower for dew point measurements, a ground-based instrument for rainfall measurements, and a data collection system in an instrument building. Figure 2.2-1 of the ER identifies one meteorological tower to the east of the central site area. Please clarify if the 91-meter tower located is to the east of the central site area as shown in Figure 2.2-1 and identify where the 10-meter tower is located.

Noise (Martinez, NRC)

Audit Needs

- NOI-1 Section 3.3 of the ER identifies sources at BFN that generate noise and identifies that the noise from the cooling towers can be heard outside.
- a. Section 2.2 of the ER states that five of the original six cooling towers have been replaced (cooling towers 1 and 3-6), cooling tower 2 is scheduled for replacement by 2027, and cooling tower 7 was constructed in May 2012. When we're cooling towers 1 and 3-6 replaced?
- b. Primary offsite noise sources in the vicinity of BFN are not discussed in the ER. Please identify the primary offsite noise sources in the vicinity of BFN.
- NOI-2 Section 3.3 of the ER states that the 2012 noise measurements were "measured at the location of the nearest residence to BFN in the Paradise Shores Community, approximately 1,500 feet from the BFN property boundary." What is the distance between the sample location (nearest residence) and the cooling towers? Was the sample location the nearest residence to the cooling towers?
- NOI-3 Section 3.3 of the ER states that a "second 24-hour ambient noise assessment was conducted between July 30 and July 31, 2020, at the same sample location as in 2012, during which a day/night sound level of 62.5 dBA was calculated (Cardno 2020)." Please confirm that the cooling towers were in operation during the 2020 ambient noise assessment.
- NOI-4 Section 3.3 of the ER identifies that in 2020 and 2022 noise levels were measured. Were measurements made when the cooling towers were not in operation? If so, please provide the noise levels when the cooling towers were not in operation.
- NOI-5 Section 3.3 of the ER states that there are no noise complaints on record for Browns Ferry. Have any noise complaints been made since submission of the ER to the NRC?

Geologic Environment (Stirwalt NRC, Meyer PNNL)

Audit Needs

- GEO-1 ER figure 3.4-1 shows a geologic cross section of the site which includes only the unconsolidated sediments, gravel fill, and the Fort Payne unit. Was the Tuscumbia completely excavated across this section? Where is the Tuscumbia present at the site? Please provide an updated geologic cross-section, if needed, or provide applicable references.
- GEO-2 Please confirm whether there have been or currently are any soil erosion issues at the site.
- GEO-3 Please identify any potentially affected geologic resources in the area.

Document Needs

- GEO-4 Please provide for review: TVA. 2014. Seismic Hazard and Screening Report for Tennessee Valley Authority's Browns Ferry Nuclear Plant: Enclosure 2, Chattanooga, Tennessee. March 2014.

Surface Water (Desotell NRC, Prasad, Tamaddun, and Ferencz PNNL)

Audit Needs

- SW-1 ER tables 2.2-1 and 2.2-2 present average daily water withdrawals and consumption by month from Wheeler Reservoir between 2016 to 2022. Please update these tables with more recent data, if available.
- SW-2 Please provide a knowledgeable person to discuss onsite surface water features (including their purpose and hydrology) described in ER Section 3.5.1.1.
- SW-3 Please provide a knowledgeable person to discuss the condenser circulating water system and the two modes of operation (open and helper modes), including the consumptive water use while operating in the two modes.
- SW-4 ER Section 3.5.1.3 states that TVA has applied for and anticipates renewal of their NPDES permit (No. AL0022080) in 2023. Please provide the status of the permit application.
- SW-5 Please describe any NPDES violations or exceedances. Provide any notices of violations and correspondence with Alabama Department of Environmental Management (ADEM) related to these violations and/or exceedances. Describe any corrective actions taken.
- SW-6 Please provide a knowledgeable person to explain why the Rivers and Harbors Act of 1899 authorization will be required for the subsequent license renewal (SLR) term as suggested in table 9.1-2 of the ER.
- SW-7 Please provide a knowledgeable person to discuss water withdrawal permit and associated requirements, if any.
- SW-8 Please provide a knowledgeable person to discuss historical releases reported in ER table 3.5-2, their potential to reach adjoining surface water features; TVA's discovery, monitoring, and reporting of these releases; and any corrective actions taken.
- SW-9 The withdrawal and consumption values discussed in ER Section 4.5.1.8 are slightly different than those presented in tables 2.2-1 and 2.2-2. For example, ER Section 4.5.1.8 states that in 2020, BFN withdrew approximately 3,289 million gallons per day (MGD) from Wheeler Reservoir of which approximately 6 MGD were consumed while tables 2.2-1 and 2.2-2 present withdrawal and consumption values of 2,738 MGD and 5.3 MGD, respectively. Please clarify this apparent discrepancy.
- SW-10 For each of the last 5 years, please provide the number of days per year the cooling towers have operated.

- SW-11 ER Section 3.5.1.3 discusses Clean Water Act Section 303(d) water quality impairments to Wheeler Reservoir. Please confirm that BFN does not contribute to these impairments.
- SW-12 ER Section 4.14.5 discusses potential cumulative impacts from surface water use (Section 4.14.5.1) but does not discuss potential cumulative impacts to surface water quality. Please provide a discussion of potential cumulative impacts to surface water quality during the SLR term.
- SW-13 Please provide a figure illustrating the site water balance.
- SW-14 Please provide a figure illustrating the locations of the NDPES external outfalls.
- SW-15 Please provide a figure illustrating the Federal Emergency Management Agency floodplain zones at the BFN site.
- SW-16 Please provide a figure illustrating the location of the submerged cooling water discharge diffuser pipes.
- SW-17 Please provide a time series figure illustrating the monthly average intake and discharge temperatures for the available period of record.
- SW-18 Please provide a time series figure illustrating the Wheeler Reservoir water level for the available period of record.

Document Needs

- SW-19 Please provide the stormwater pollution prevention plan.
- SW-20 Please provide the Spill Prevention and Control Countermeasures plan/the Integrated Pollution Prevention plan.
- SW-21 Please provide the water withdrawal permit (if any).
- SW-22 Please provide: Sharkey J.K. and Springston G.L. 2022. Water Use in the Tennessee Valley for 2020 and Projected Use in 2045.
- SW-23 Please provide: Browns Ferry Nuclear Plant Thermal Performance Program Cooling Tower Capacity Improvements Environmental Assessment. June 2020.
- SW-24 Please provide: TVA. 2020c. ADEM NPDES/SID Non-Compliance Notification Form. July 20, 2020.

Groundwater (Stirewalt NRC, and Meyer, PNNL)

Audit Needs

- GW-1 Describe the available data on site groundwater levels and water levels of site surface water bodies, including Wheeler Reservoir. If available, provide site groundwater levels and Wheeler Reservoir elevations for the last five years, or provide a reference to this information. Provide an appropriate expert available at the virtual audit to discuss site groundwater elevations vis-à-vis Wheeler Reservoir elevations and the interpretation of groundwater flow paths and flow rates at the site. Please provide an appropriate expert at the virtual audit to describe the plant infrastructure that potentially affects groundwater flow paths.
- GW-2 ER 3.5.2.1 states that, “Groundwater elevations at some groundwater wells were strongly correlated with Wheeler Reservoir stage levels while groundwater elevations at other exhibited secondary elevation trends that resembled either groundwater extraction or injection cycles over a period of days. This occurred in the general vicinity of the Radwaste Building yard where groundwater elevations are typically lower than other wells near Wheeler Reservoir. Groundwater elevation data collected between April 2020 and April 2021 indicated that some plant process may affect groundwater hydraulics in this area, but the potential groundwater drawdown and recovery in this area has not been determined.” Please provide additional information on groundwater extraction and injection practices at the site, including locations, rates, and purposes.
- GW-3 Periodic groundwater dewatering occurred between 1969 and 1984 but ceased in 1984. Provide additional information on this dewatering. What was the reason for the dewatering? Why did it cease? Please confirm whether there has been any dewatering at the site since 1984. Are there any plans for future dewatering?
- GW-4 Please provide measured values, or references to these, for the saturated hydraulic conductivities of the geologic units at the site.
- GW-5 Please provide additional information about the locations of private wells located within two miles of the plant site.
- GW-6 Please provide additional information about the site monitoring wells, including well depths, screen elevations, screen lengths, geologic unit monitored, and purpose of well monitoring. Provide an appropriate expert at the virtual audit to describe the structures, systems, and components being monitored by the groundwater wells.
- GW-7 Please confirm whether there have been any inadvertent spills or leaks of radiological contaminants since the preparation of the 2023 Annual Radiological Environmental Operating Report.
- GW-8 Please confirm whether there have been any inadvertent spills or leaks of nonradiological contaminants in the last 10 years that have affected groundwater quality.

GW-9 Please provide appropriate expert(s) at the virtual audit to describe historical tritium releases at the site, including source investigations and conclusions, estimated volumes released, monitoring, response actions, etc.

Document Needs

GW-10 Please provide for review: site procedures related to implementing the Groundwater Protection Initiative.

GW-11 Please provide for review: TVA. 2006. BFN Plant Investigation of Tritium Releases to Groundwater. June 2006.

GW-12 Please provide for review: Arcadis. 2016. Site Conceptual Model Update. BFN Plant. Athens, Alabama. November.

GW-13 Please provide for review: Arcadis. 2021. 2021 Site Conceptual Model Update. BFN Plant. Athens, Alabama. September.

Terrestrial Resources (Hsu NRC, Vesty and Fuentes, PNNL)

Audit Needs

TER-1 Section 3.2 states that Browns Ferry has one meteorological tower that is 30 feet above plant grade and is part of the meteorological facility consisting of 91 meters (300 foot) instrument tower for wind and temperature measurements and a 10-meter (33 foot) tower for dew point measurements. Please confirm the above ground height of the MET tower and state whether the MET tower is lit or unlit, and guyed or not guyed. If lit, please state lighting colors and whether lights are steady or blinking.

TER-2 Section 3.6.1.4 details out the state protected and critically imperiled (S1) and imperiled (S2) ranked species as recorded from the TVA Regional National Heritage database within a 5-mile radius of the site. Please provide if these species occur within a 6-mile radius of the site.

TER-3 Section 3.6.1.4 mentions that osprey nests were observed on a cell tower and transmission tower in 2021 and that the inactive nest on the cell tower was removed shortly after the survey. Please confirm if ospreys continue to nest onsite and if so, a summary of where the ospreys are nesting.

TER-4 Section 4.6.1.5 mentions bird collisions with plant structure and transmission lines; however, the ER provides no data on bird injuries or mortalities on the Browns Ferry site. Please provide the following: 1) a summary of bird mortalities or injuries (species, date, count of individuals, cause if known) in chronological order from 2013-2024, 2) any detailed reports for each incident, if any.

Document Needs

- TER-5 Section 3.6.1.3 states that invasive terrestrial species in the immediate vicinity of Browns Ferry are continually monitored and managed as needed. Please provide a copy of the management plan if there is a management or a summary of how the invasive species are managed if there is no management plan.
- TER-6 Sections 2.2.6.2 and 4.6.1.6 state that TVA is currently developing a Memorandum of Understanding in coordination with the United States Fish and Wildlife Service and an Avian Management Plan. Please provide the avian management plan for NRC's review.

Aquatic Resources (Doub NRC, Wessel, PNNL)

Audit Needs

- AQU-1 Where is the cooling water intake structure discharge/ diffusers into Wheeler Reservoir located? Does the discharge location change based on whether the plant is in open mode or helper mode?
- AQU-2 Please explain more about the changes in flow velocity depending on how many units are running and which mode the plant is operating in including where the flow velocity is measured.
- AQU-3 Please explain or provide a picture / diagram that shows where and how water enters the intake forebay, is this passive? Is there grating or racks to keep large stuff out? If yes, what is the spacing?
- AQU-4 What is ADEMs final best technology available determination for entrainment under the CWA Section 316(b) Rule? Please provide documentation of this determination.
- AQU-5 Has BFN decided on a method for impingement compliance? Please describe that planned method including timeline for implementation and specific information on the system being used and how it will function (ex. Fish return).
- AQU-6 Zebra Mussels are mentioned in Section 4.6.2.6 but not in Section 3.6.2.2 or 3.6.2.3, please describe concentrations of zebra mussels, control measures used on them, and if there are also quagga mussels present.
- AQU-7 In Table 3.6-7 what do "---" and "X" stand for?
- AQU-8 Please describe TVAs program to ensure adequate oxygenation of the Tennessee River (Section 4.6.2.7).
- AQU-9 What volume of material had to be dredged from the intake channel in 2018 and over what time period did dredging occur (Section 4.6.2.10)? Is there an existing US Army Corp of Engineers Section 404 permit? If yes, please provide a copy.

- AQU-10 Is there an increase in water loss due to evaporation in the months when the cooling towers are operational? If yes, what is the average increase in water loss (Section 2.2 and 4.6.2.11)?
- AQU-11 Which outfalls are the CWS discharge? DSN001, DSN0011, DSN0012 (Section 3.5.1.2 and NPDES Permit)?
- AQU-12 What is the average discharge temperature decrease contribution for each cooling tower as they are activated?
- AQU-13 Please provide additional information on TVA's ability to achieve a no more than 10 °F increase in discharge water temperature.

Document Needs

- AQU-14 Please provide a copy of the new 2023 NPDES permit from ADEM (attached NPDES expired 8-31-2023).
- AQU-15 Please provide: TVA. 2021b. Clean Water Act Section 316(b) § 122.21(r) Compliance Documentation for the BFN Plant, Limestone County, Alabama. April.
- AQU-16 Please provide: TVA. 2021c. Evaluating the Presence and Maintenance of a Balanced Indigenous Population of Fish and Wildlife in the Tennessee River Downstream of TVA's BFN Plant. June.
- AQU-17 Please provide: USACE Section 404 permit
- AQU-18 Please provide: 2004 Reservoir Operations System Plan (oxygenation section)
- AQU-19 Please provide: Amaker T. 2021. Browns Ferry Nuclear Mussel Survey, Limestone County, Alabama. July 12-13, 2021.
- AQU-20 Please provide: TVA. 2020b. Clean Water Act Section 316(b) § 122.21(r)(9) Entrainment Characterization Study for the BFN Plant. River and Reservoir Compliance Monitoring Program.
- AQU-22 Please provide: TVA. 2020c. ADEM NPDES/SID Non-Compliance Notification Form. July 20, 2020.
- AQU-23 Please provide: TVA. 2022b. TVA BFN Power Plant NPDES Permit No. AL0022080. Updated Final §316(b) Rule Information 40 CFR 122.21(r)(10) Submittal. January.

Federally Protected Ecological Resources (Doub NRC, Wessel and Fuentes, PNNL)

Audit Needs

- FED-1 Section 3.6.1.4 of the ER states that suitable habitat for the monarch butterfly is likely present in undeveloped portions of the Brown's Ferry site. Monarch butterflies rely on milkweeds (*Asclepias* spp.) for ovipositing and for larval food. Adults rely on a variety of plants for nectar sources. Does TVA have any records of milkweed occurring on the Brown's Ferry site? If so, when was the last time milkweed was documented on site. Does TVA have a list of vascular plants occurring on the site? If so, when was the plant list collected?
- FED-2 Section 4.14.6.3 states that existing procedures consider impacts to threatened and endangered species and their habitats as part of operations and maintenance. Please describe these procedures in more detail as they concern Federally protected ecological resources and provide copies of relevant site plans and procedures for NRC staff review.
- FED-3 Section 3.6.2.4 states that paddlefish and snail darter have been found in sampling done by TVA in the vicinity of BFN, but they are not listed in table 3.6-4. Please provide an updated complete list of species collected and the most recent year each species was found during sampling.

Document Needs

- FED-4 Section 3.6.1.4 of the ER states that surveys performed using the 2020-2021 U.S. Fish and Wildlife Services Indiana bat survey guidelines identified forest habitat across the Browns Ferry site that may offer potential summer roosting habitat for Indiana bats, northern long-eared bats, or tricolored bats. Please provide a copy of these surveys.
- FED-5 Please provide: TVA. 2021b. Clean Water Act Section 316(b) § 122.21(r) Compliance Documentation for the BFN Plant, Limestone County, Alabama. April.
- FED-6 Please provide: Amaker T. 2021. Browns Ferry Nuclear Mussel Survey, Limestone County, Alabama. July 12-13, 2021.

Historic and Cultural Resources (Nancy Martinez, Jeffery Larson NRC, Lindsey Renaud PNNL)

Audit Needs

- HCR-1 Please provide a pre-contact and historic cultural context of the site and region, including the history of Browns Ferry and images of its construction.

- HCR-2 Section 3.7 of the ER states "...a total of 10 cultural resource have been inventories previously within or directly adjacent to the BFN, all of which represent archaeological sites. An additional five archaeological sites have been recorded within 1,000 feet of BFN." Section 3.7.2 of the ER states that "besides sites 1LI284 and 1LI287, TVA and the SHPO have agreed that site 1LI535 also is potentially eligible for the NRHP."
- Please confirm if when stating "within or directly adjacent to the BFN" and "within 1,000 feet of BFN" in the statements above, TVA is referring to the 880-acre BFN site (i.e., area of potential effect [APE]).
 - Please clarify and identify the total number of archaeological sites within the APE and how many sites are eligible or potentially eligible.
 - Please provide information on the 10 archaeological sites that have been recorded within or directly adjacent to BFN, 3 potentially eligible sites (1LI284, 1LI287, and 1LI535), and 5 additional sites within 1,000 feet BFN, including date first identified, type of site, site numbers, location (on a map), and other relevant information.
- HCR-3 Section 3.7.2 indicates that the entirety of the APE has been surveyed but the section lacks specific information on what previous surveys occurred and where. Please provide information on how many previous surveys occurred within the APE, the reasoning for the surveys, acreage surveyed, location of surveys, and whether any cultural resources were identified.
- HCR-4 Please provide general information on TVA's archaeological program, including TVA's criteria for archaeological and built environment surveys, how cultural resource surveys are performed, monitoring of ground disturbing activities, and other relevant information. How does TVA staff know if there are known previously recorded sites within a project area and that they should be avoided?
- HCR-5 The ER did not identify plans or procedures for the protection of cultural resources, or the inadvertent discovery of human remains. Please provide TVA's procedures and other best management practices for the protection of cultural resources. Describe what workflow processes would be enacted if the inadvertent discovery of human remains were to happen, including coordination with the local coroner's office, Tribes, and the Alabama (AL) SHPO. Provide a copy of an Inadvertent Discovery Plan for cultural resources and human remains.
- HCR-6 Please provide information on the Browns Ferry historic district, including its significance under Criteria A, C, and Criteria Consideration G. Section of the ER states that TVA provided the Reynolds 2022 report to SHPO and invited their comments on the study and on the NRHP eligibility prior to making any decisions on SLR or future projects that could affect BFN. Detail how TVA plans to minimize potential impacts to the historic district and contributing properties for any projects that may affect them, including from maintenance actions, plant improvements, or upgrades.

- HCR-7 Please discuss if there are any plans to repurpose or remove the Browns Ferry Aquatic Research Facility.
- HCR-8 Are Tribes invited to participate in ground-disturbing activities and other projects within the APE? Please confirm if TVA engages with Tribes in any other context outside of consultation. Additionally, confirm if state-recognized Tribes are consulted and invited to participate in the BFN's activities.
- HCR-9 Section 3.7.2 of the ER states, "with the combined areas of Dison's 2021 survey and prior archaeological surveys in the APE (Dison et al. 2020, Gage 2001, Gage and Hermann 2009, Marshall 2013, Stanton 2013) all areas within the APE that are not developed or subjected to heavy disturbance in the past..." Please confirm if the Dison's 2021 survey referenced in this statement should be Dison et al. 2022. If Dison 2021 is the correct survey, please provide a copy.
- HCR-10 Section 2.2 of the ER states that five of the original six cooling towers have been replaced (cooling towers 1 and 3-6), cooling tower 2 is scheduled for replacement by 2027, and cooling tower 7 was constructed in May 2012. Section 3.7.3 of the ER states that TVA conducted a historic architectural inventory of BFN and assessment of BFN's eligibility for inclusion in the NRHP. Based on the study, TVA determined that BFN is eligible as a historic district. The BFN historic district is comprised of 49 buildings and structures. Twenty structures within the boundaries of the district are considered non-contributing due to being built after 1980. Please discuss TVA's plans to mitigate potential impacts to the historic district due to the scheduled cooling tower 2 replacement in 2027.
- HCR-11 Please describe how each cultural resource meets or does not meet the NRHP eligibility criteria in 36 CFR 800.60.4. For those resources that are eligible or listed on the NRHP, please describe their historic integrity.
- HCR-12 Section 3.7 of the ER provides a quote which, in part, states: "plant improvements including intake structures, buried piping, and large external tanks would be expected upgrades for continued operation from 60 to 80 years." Please provide a reference for the quote and describe how these improvements will or will not affect historic properties and cultural resources.
- HCR-13 Section 4.7 of the ER states that "extended operation will have no adverse effect"; however, SHPO concurrence from November 2022 states there will be no effect. Please provide justification for the finding of effect by describing how each historic property will or will not be affected. For historic properties that will be affected, please describe how they will be affected and if the criteria of adverse effect in 36 CFR 800.5(a)(1) will or will not be reached.

Document Needs

HCR-14 Please provide the following documents and ER references:

- Dison Braden A., Heather Bass, Hunter B. Johnson, Brittney Carnell, Katie Weis and Breiding Katie. 2022. A Phase I Archaeological Survey of Previously Unsurveyed Areas within the TVA's BFN Plant in Limestone County, Alabama. Prepared by Tennessee Valley Archaeological Research, Huntsville, Alabama. Prepared for TVA, Knoxville, Tennessee. Classified report, not publicly available.
- Dison Braden A., Dan H. Webb, Heather Bass, Elin Crook and Johnson Hunter B. 2020. A Phase I Archaeological Survey of BFN Plant Meteorological Tower
- Tree Clearing Project in Limestone County, Alabama. Prepared by Tennessee Valley
- Archaeological Research, Huntsville, Alabama. Prepared for Tennessee Valley
- Authority, Knoxville, Tennessee. Classified report, not publicly available.
- Reynolds Mike. 2022. Historic Architectural Resources Survey of the BFN Plant Project, Limestone County, Alabama. Prepared by Brockington and Associates, Inc., Atlanta, Georgia. Prepared for TVA, Knoxville, Tennessee. Classified report, not publicly available.
- Marshall. 2013. A Phase I Archaeological Survey for the Trinity-Browns Ferry Nuclear Plant 161-kV Transmission Linen Project, Limestone and Morgan Counties, Alabama. Prepared by Tennessee Valley Archaeological Research, Huntsville, Alabama. Prepared for TVA, Knoxville, Tennessee. Classified report, not publicly available.
- Stanton Jessica C. 2013. Phase I Archaeological Survey of TVA's Browns Ferry-Athens 161-KV TL Rebuild and Associated Access Roads in Limestone County, Alabama. Prepared by Tennessee Valley Archaeological Research, Huntsville, Alabama. Prepared for TVA, Knoxville, Tennessee. Classified report, not publicly available.
- Karpynec T. and Weaver M. 2018. Phase I Architectural Assessment for the Tennessee Valley Authority's Browns Ferry Aquatic Research Facility, Limestone County, Alabama. Prepared by Tennessee Valley Archaeological Research, Huntsville, Alabama. Prepared for TVA, Knoxville, Tennessee. Classified report, not publicly available.⁸

Socioeconomics (Hsu and Rikhoff, NRC, Niemeyer and Rackley, PNNL)

Audit Needs

SOC-1 Please provide an update to table 3.8.7 to include 2023 payments.

Human Health (Leah Parks NRC)

Audit Needs

- HH-1 Please have Browns Ferry subject matter experts available to discuss the electrical safety program along with related Occupational Safety and Health Administration (OSHA) regulations as implemented at the site under the industrial safety program. Plan to discuss the safety specific policies for work conducted at electrical transmission locations and a walk-through of the workplace hazards identification process and jobsite analysis noting how change evaluations would identify electric shock hazards or potential human error to eliminate risk during work on the in-scope transmission lines.
- HH-2 Please provide an overview of the radiation control program with emphasis on the as low as reasonably achievable program to control worker radiation exposure (annual dose goals and status). Please discuss the annual variations in total personnel with measurable dose and the average total effective dose equivalent (TEDE) per worker noting that the average TEDE per worker at Browns Ferry tends to be higher than the boiling water reactor industry average over the rolling three-year periods summarized in NUREG-0713. Include in this discussion any plant or site-specific factors (e.g., plant design, equipment issues, etc.) that contribute to source terms and therefore doses averaging higher than the BWR industry average. Are there any proposed changes or upgrades to the program being considered during the subsequent license renewal term or site plans/goals to maintain doses ALARA?
- HH-3 Sections 4.9.5, and 4.9.7 discuss programs that fall under the site's industrial safety program. Please have a subject matter expert in the industrial safety program available to discuss the site-specific occupational safety program and industrial hygiene practices employed onsite to ensure compliance with federal, state, and local laws, regulations, and permits as it relates to both microbiological hazards to plant workers and physical occupational hazards. In addition to a general site-specific discussion of the programs, plans, and procedures applicable to industrial safety, plan to further discuss worker safety programs and procedures related to work in and around cooling towers and condenser tubes.
- HH-4 Section 4.9.7 notes that TVA has a comprehensive occupational safety program and notes statistics from the Bureau of Labor Statistics through 2020. It is noted in this section that Browns Ferry "carries low incidence of OSHA-recordable work-related injuries and illnesses," but this is not quantified in the site-specific environmental report. Please provide quantitative values for Browns Ferry incidence rate of OSHA-recordable work-related injuries and illnesses and justify the statement that this is a low incidence as stated in Section 4.9.7.

Waste Management (Palmrose, NRC)

Audit Needs

WM-1 RG 4.2S1, Section 3.11, Waste Management, states the ER should provide the descriptions, names, and locations of facilities currently used and likely to be used in the future for offsite processing and disposal of wastes. While licensed processing and LLRW disposal sites are given, some locations are not provided in ER Section 2.2.4.5. A search for information on TOXOCO Inc. and Unitech Service Group, Inc. indicate their radiological waste processing locations could be in or nearby Oak Ridge, TN.

Please provide a knowledgeable expert to discuss with the staff the locations where BFN radiological waste maybe shipped to for further processing and disposal.

WM-2 RG 4.2S1, Section 3.11, Waste Management, states the ER should provide pollution prevention and waste minimization measures in place or planned to reduce or eliminate the quantities of gaseous and liquid emissions to the environment and the quantities of wastes shipped offsite for processing or disposal. ER Section 4.9.2 presents two procedures for such pollution prevention and waste minimization.

Please provide for staff review and make available an subject matter expert (SME) to discuss the Integrated Pollution Prevention Plan that describes fuel and hazardous minimize the potential for release of these materials to surface water and the “A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4, 2022” that also describes the material management requirements to minimize the potential for release of fuels and hazardous materials.

WM-3 As part of the effluent control systems, provide a knowledgeable expert to discuss the provisions made to sample and analyze fluids before discharge as discussed in 2.2.4.1. In addition, please plan to discuss how the plant processes radioactive effluents to maintain radiation doses to the public to levels that are ALARA. Are there any proposed changes or upgrades to the program being considered during the license renewal term?

WM-4 BFN is subject to the reporting provisions of 40 CFR 110 as it relates to the discharge of oil in such quantities as may be harmful pursuant to Section 311(b)(4) of the Federal Water Pollution Control Act. Given that the ER is silent on any such discharges, apparently there were no reportable releases at BFN that have triggered this notification requirement. If there have been any reportable releases which would trigger this notification requirement since the ER was written, please provide a description of the releases.

WM-5 If there have been any reportable unplanned releases of **radioactive** materials (unplanned/inadvertent radioactive liquid or gaseous releases) which would trigger a notification requirement since the ER was written, please provide a description of the releases. Please be prepared to discuss your plan to handle unplanned releases of radioactive materials.

- WM-6 If there have been any reportable inadvertent releases or spills of **nonradioactive contaminants** which would trigger a notification requirement since the ER was written, please provide a description of spills/releases. Please be prepared to discuss your plan to handle inadvertent nonradioactive releases.

Document Needs

- WM-7 Please provide BFN's Integrated Pollution Prevention Plan and "A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4, 2022" via the electronic reading room. Provide any other procedures related to the radioactive and nonradioactive waste management, waste minimization, and stormwater BMPs.
- WM-8 Drawings and photos that are highlighted/marked showing the flow paths for releases for both radiological and non-radiological waste paths (e.g., there is ER figure 3.5-3). Please have subject matter experts available to discuss the flow paths.
- WM-9 Please provide the log of approved waste vendors used to manage and dispose of hazardous and non-hazardous waste as discussed in Section 2.2.5.3 of the ER.

Spent Nuclear Fuel (Donald Palmrose, NRC)

Audit Needs

- SNF-1 Section 2.2.4.4 of the ER states:
- Expansion of the onsite spent fuel storage capacity is required in the future if a national storage solution for the permanent storage of spent fuel does not become available during the subsequent period of extended operation. The current ISFSI storage pads are projected to be filled on or before year 2036. Under the existing licenses and assuming decommissioning at the end of the current license periods, an additional 104 dry fuel storage casks will be needed to support operations and decommissioning. The addition of a third ISFSI storage pad to further increase storage capacity needed for the subsequent period of extended operation is under consideration, but plans are in the conceptual stage and no installation schedule has been established. The BFN site has adequate space onsite to accommodate the construction of an additional ISFSI pad if necessary.
- Please discuss the storage plans for the spent fuel produced during the license renewal term, including the plans and the potential area for expansion or additional storage locations necessary for capacity for license renewal term.

SNF-2 Please provide a knowledgeable expert to discuss the burnup levels of the BFN spent fuel being stored in the spent fuel pools and the ISFSI given that the levels could be between 33,000 to 62,000 MWd/MTU and whether there are any plans to extend the maximum burnup levels above 62,000 MWd/MTU during the license renewal term.

Document Needs

SNF-3 Please provide related burnup levels of the spent fuel being stored at the BFN site.

Greenhouse Gas Emissions and Climate Change (Martinez, NRC, Flaherty and Goldberger, PNNL)

Audit Needs

GG-1 Section 7.2.3 of the ER provides broad impacts of the alternatives that TVA considers to be reasonable alternatives to the BFN SLR. These are listed as a combination of gas-fired combined cycle generation, gas-fired combustion turbine generation, solar generation and storage, and new nuclear generation. Table 7.2-1 provides a total annual criteria pollutant and greenhouse gas emission for a 500 MWe natural gas-fired station gas turbines. Please provide similar annual emissions data (criteria emissions and greenhouse gases emissions) for each of the combination technologies considered for the reasonable alternative to reflect the quantitative contribution of the combination technologies.

Cumulative Impacts (Hoffman, and Rikhoff, NRC, Goodman, and Hare, PNNL)

Audit Needs

CC-1 Per 10 CFR 51.53(c)(3)(ii)(O), please provide information about other past, present, and reasonably foreseeable future actions occurring in the vicinity of the nuclear plant that may result in a cumulative effect that may have occurred since the ER was submitted.

Postulated Accidents (Robinson, and Dozier, NRC)

PA-1 A. The ER stated for internal events, that:

The core damage frequency and large early release frequencies are between one and two orders of magnitude below the conservative value of 1.0E-4 per reactor-year.

...plant risk from internal events at BFN is like the license renewal environmental review in 2003 (TVA 2003). Also, TVA is aware of no changes to the plant likely to occur during the subsequent period of extended operation that would adversely affect plant risk from internal events. Therefore, TVA concludes that no new and significant information exists for BFN concerning offsite consequences from severe accidents initiated by internal events.

B. The ER stated for external events, that:

...even though the BFN fire and seismic CDFs (BFN Fire, BFN Seismic) exceeded the BFN internal events CDF, the fire and seismic CDFs for BFN, and the sum of the two, are less than $1.0E-4$ per reactor-year... Since performance of the BFN initial 40-to-60-year SAMA analysis, several changes have been implemented at the site that are "risk-beneficial."

TVA is aware of no changes to the plant likely to occur during the subsequent period of extended operation that would adversely affect plant risk from external events. Based on the information provided above, TVA concludes that no new and significant information exists for BFN concerning offsite consequences of severe accidents caused by external events.

Please be prepared to discuss.

PA-2

In the ER, TVA indicated that it has performed a SAMA evaluation for all three units in accordance with the Nuclear Energy Institute (NEI) 17-04, Rev. 1, "Model SLR New and Significant Assessment Approach for SAMA," methodology. NEI 17-04 specifies, "Further documentation of the new and significant information review is listed in Section 3.5.2." Furthermore NEI 17-04 indicates, "Such documentation should be available to the NRC [U.S. Nuclear Regulatory Commission] either in the SLR] ER (at the SLR applicant's discretion), or in supplemental information for review via E-document reading room, audit, and RAIs [requests for additional information]."

The staff would like to briefly discuss the probabilistic risk assessment revisions and changes to the risk models since the 40-to-60-year license renewal application (focusing on changes made at the plant that have significantly reduced or increased risk) and some of the quantitative results.

PA-3

NEI 17-04 Section 3.1 "Data Collection" specifies:

"Use the latest risk models that are available for internal events (including internal flooding) and for each of the external events contributors identified for evaluation in NEI 05-01 ["Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document," Revision A, November 2005]."

NEI 05-01 specifies:

“The IPEEE [Individual Plant Examination of External Events] identified the highest risk externally initiated accident sequences and potential means of reducing the risk posed by those sequences. Typically, the following external events were evaluated:

1. Internal fires
2. Seismic events
3. Other external events such as high wind events, external flooding, transportation and nearby facility accidents”

Please explain how “Other external events such as high wind events, external flooding, transportation and nearby facility accidents” were considered in the BFN SAMA New and Significant Evaluation? Discuss any recommendations to reduce risk due to each of these external events.

PA-4 Please be prepared to discuss ER Chapter 5, Assessment of New and Significant Information.

PA-5 Please be prepared to discuss any BFN or other facility external event SAMAs evaluated.

PA-6 The ER states that: None of the 36 SAMAs for which quantifications were performed reduced the maximum benefit for BFN by 50 percent or more. Therefore, it was concluded that no “new and significant” information relevant to the BFN SAMA analysis exists, and no further analysis is needed.

Please be prepared to discuss.

PA-7 Please be prepared to discuss ER Section 4.10.1, *Design-Basis Accidents* relative to the process used to determine there was no new and significant issues.

**Browns Ferry Virtual Environmental Audit
Virtual Audit Schedule
(week of September 30, 2024)**

All times below are in Eastern time zone.

Monday, September 30, 2024

START	END	ACTIVITY
9:00 am ET	9:30 am ET	Entrance meeting between U.S. Nuclear Regulatory Commission (NRC), Tennessee Valley Authority (TVA) and Pacific Northwest National Laboratory (PNNL)
9:30 am ET	4:00 pm ET	Virtual tours/virtual meetings between NRC, PNNL, and contractor subject matter experts (SMEs)

Tuesday, October 1, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	Virtual tours/virtual meetings between NRC, PNNL, and contractor SMEs

Wednesday, October 2, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	Virtual tours/virtual meetings between NRC, PNNL, and contractor SMEs

Thursday, October 3, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	Virtual tours/virtual meetings between NRC, PNNL, and contractor SMEs

Friday, October 4, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	Virtual tours/virtual meetings between NRC, PNNL, and contractor SMEs

**Browns Ferry Virtual Environmental Audit
In-Person Audit Schedule
(week of October 7, 2024)**

All times below are in Central time zone.

Tuesday, October 8, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	NRC site visit

Wednesday, October 9, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	NRC site visit

Thursday, October 9, 2024

START	END	ACTIVITY
9:00 am ET	4:00 pm ET	Exit meeting between NRC, TVA, PNNL and contractors